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**AN ANALYSIS OF 30 SCALES OF LEADERSHIP
IN A SIMULATED COMBAT SITUATION**

16
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and
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Research Memorandum 75-6

AN ANALYSIS OF 30 SCALES OF LEADERSHIP
IN A SIMULATED COMBAT SITUATION

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AN ANALYSIS OF 30 SCALES OF LEADERSHIP IN A SIMULATED COMBAT SITUATION

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AN ANALYSIS OF 30 SCALES OF LEADERSHIP IN A SIMULATED COMBAT SITUATION

BACKGROUND

A broadly conceived research program has been conducted by ARI to provide the Army with scientific means of identifying officers with certain aptitudes and characteristics necessary for success in different kinds of leadership situations. Previous research¹ dealt with detailed and complex analysis of officer performance across many varied tasks and situations. In this research, officers went through an intensive three-day exercise in a simulated combat situation at the Officer Evaluation Center (OEC) at Fort Benning, Ga., and performed 15 missions composed of five combat, five technical, and five administrative tasks. Two thousand single observations were made and were subsequently reduced to approximately 300 scales.

Factor analysis of these scales resulted in 30 orthogonal factors of which 28 were unique to a particular mission. With the addition of 11 independent variables, the resulting 39 scales were further factored, finally reducing to 8 clearly interpretable factors. (Appendix A presents the loadings of marker and independent variables on the eight basic factors of OEC performance.) These 8 factors were extended to all the original scales with interpretations confirmed.

The analysis reported here deals with the original intercorrelations from unweighted raw scores from the 30 scales established on the basis of the 30 factors. An approximation to second-order factoring was performed to investigate whether consistency would be maintained with the original 8 leadership dimensions. The robustness of the original dimensions, as well as their generalizability, is the issue.

METHOD

Sample

The sample on which the original analysis was based was 735 officers from 10 branches. Table 1 describes these officers by branch, grade and source of commission.

Analysis

A principal components factor analysis was done on the original 30 factor matrix with unities in the diagonal as the communality estimate. A varimax rotation was then done. A five-factor solution was chosen after comparison of solutions from 3 to 11 factors, based on clarity of factor definition both as to number of significant loading and interpretability.

¹ Helme, W. H., Willemin, L. P., and Grafton, F. C. Dimensions of leadership in a simulated combat situation. ARI Technical Research Report 1172, July 1971. (AD 730 315)

Table 1
SUMMARY OF OEC SAMPLE BY COMMISSION, GRADE, AND BASIC BRANCH
(N = 735)

Branch	Source of Commission						Total
	USMA		ROTC-RA		ROTC-Res		
	1 LT	2 LT	1 LT	2 LT	1 LT	2 LT	
Infantry	25	1	30	2	13	28	99
Armor	5	0	7	2	35	41	90
Artillery	13	1	15	0	31	26	86
Air Defense	22	0	5	1	0	25	53
Engineer	8	0	4	0	30	28	70
Ordnance	0	0	0	0	111	13	124
Quartermaster	0	0	1	0	48	22	71
Signal	0	0	0	0	42	26	68
Adjutant General	0	0	0	0	30	4	34
Finance	0	0	1	0	31	8	40
Total	73	2	63	5	371	221	735

Note: From Figure 1 in Helme, W. H., Willemin, L. P., and Grafton, F. C. Dimensions of leadership in a simulated combat situation. ARI Technical Research Report 1172, July 1971.

RESULTS

Table 2 presents the rotated factor loadings for the five-factor solution. Although the entire 30 x 5 table is presented, a factor loading criterion of .30 was established for inclusion in a given factor interpretation. Also included in Table 2 is the total proportion of variance each of the 5 factors accounted for. As can be seen, Factor III accounts for the most variance, followed by Factors IV, I, II, and V.

Table 3 presents the first factor, "Completed Staff Work." The original factor is presented, along with the contributing scales. Factor I is heavily influenced by behaviors associated with mission effectiveness, especially in technical-managerial situations. Written and oral reporting influence this factor, as does motivation.

Table 2

FIVE-FACTOR ANALYSIS OF ORIGINAL 30 FACTORS

Original Factor	Rotated Factor Loadings				
	I	II	III	IV	V
1	.32	-0.11	.37	.25	.04
2	.19	-0.23	.10	.56	-0.09
3	.20	.04	.32	.57	.07
4	.06	-0.26	.77	.14	-0.09
5	.34	-0.17	.31	.00	-0.26
6	.32	-0.17	.49	.42	-0.01
7	.01	-0.53	.05	.16	-0.09
8	.29	-0.23	.04	.58	-0.01
9	.06	.23	.33	.47	.28
10	.20	.00	.37	.19	-0.06
11	.77	.01	.22	.25	.13
12	.40	-0.18	.25	.07	-0.33
13	.13	-0.61	.18	.18	-0.20
14	.32	-0.12	.37	.15	-0.46
15	.76	.05	.05	-0.10	.13
16	-0.14	-0.15	.06	.42	.10
17	-0.15	.13	.07	.54	-0.03
18	-0.01	.03	.11	-0.05	.61
19	.24	-0.01	-0.38	.38	-0.24
20	-0.10	-0.28	-0.25	.03	.37
21	.04	-0.61	.11	.03	-0.03
22	.05	-0.03	-0.10	.09	.30
23	.02	-0.58	.18	-0.11	.23
24	.00	-0.27	.62	.05	-0.01
25	.09	-0.09	.21	.48	-0.05
26	.01	.04	.54	.13	.03
27	.10	-0.05	.57	.21	-0.04
28	-0.10	-0.14	-0.14	.05	-0.63
29	.47	-0.40	-0.14	.07	-0.12
30	-0.13	-0.14	.21	.21	-0.15
Proportion of Variance	.08	.07	.10	.09	.06

Table 3
STRUCTURE OF REPRODUCED FACTORS: FACTOR I--COMPLETED STAFF WORK

Factor Loading	Original Factor	Contributing Performance Variables*		Judgmental Descriptor of Original Factor ^b
		Individual Scale Code	Description	
.77	XI Site Selection			Technical-Managerial Mission Effectiveness
		DMOR	Rated motivation	
		DBAF	Bearing and assurance	
		DBAR	Rated bearing and assurance	
		DMAF	Extent mission accomplishment	
		DEEF	Effectiveness of expression	
		DUMR	Rated understanding mission	
		DKCF	Keeping cool	
.76	XV Weapons Assessment			Technical-Managerial Mission Effectiveness
		HMID	Suppl reporting of ident clues	
		HNUL	Basic reporting of ident clues	
		HMED	Rept mech details and other intell	
		HMOR	Rated motivation (effort)	
.47	XXIX Site Selection			Communication and Staff
		DFIF	Following instructions	
		DMAF	Extent mission accomplishment	
		DCOM	Thoroughness in assigned task	
		JTEH	(Rd Dmg& Radn) Rec repte radn levels (IV)	
.40	XII Improper Supply Records			Communication and Staff
		CSBR	Rated bearing, poise in stress bfg	
		CSOR	Rated org of stress bfg	
		CSMR	Rated motivation in stress bfg	
		CSFR	Rated fluency in stress bfg	
		CSAR	Rated aptop aggres in stress bfg	
		CSPR	Rated adher to prin in stress bfg	
.34	V Production Analysis			Technical-Managerial Mission Effectiveness
		BRLR	Rated relevance of written report	
		BADR	Rated overall admin effectiveness	
		BMCR	Rated language of written report	
		BPUC	Written rept: statement of purpose (CL)	
.32	I Security Mission			Combat Mission Effectiveness
		KCAR	Rated overall combat aptitude	
		KTTC	Eff of total mission behavior	
		KDHR	Rated decisive without haste	
		KBAR	Rated bearing and assurance	
		KGAR	General ability	
		KMCF	Extent mission completed	
		KEDP	Eff of defense plan (CL)	
		KCSR	Rated considerate within mission reqr	
		KUMF	Understanding mission	
		KBAF	Bearing and assurance	
		KFHP	Firm handling of personnel	
.32	XIV Highway Traffic Plan			Technical-Managerial Mission Effectiveness
		EMAF	Extent mission accomplished	
		EFIF	Following instructions	
		ETTT	Tonnage delivered	
		EMOR	Rated motivation (effort)	
		EBAF	Bearing and assurance	
.32	VI Road Damage and Radiation Survey			Technical-Managerial Mission Effectiveness
		JOER	Rated overall eff in mission	
		JMOR	Rated motivation (effort)	
		JBAR	Rated bearing and assurance	
		JMOF	Motivation (effort)	

* From Appendix, Helme et al., 1971, op. cit.

^b From Table 2, Helme et al., 1971, op. cit.

Table 4 presents Factor II, "Quantitative Staff-Work Organization." The highest loading on this factor occurs in military operations staff work (March Order) and closely related technical support (Airfield Layout). Road Damage and Site Selection reflect the utilization-application of intelligence data and therefore adequately complement this factor. This factor loads on quantitative/organizational types of activities and mission accomplishment.

Factor III, "Combat Mission Requirements," is presented in Table 5. This factor refers to combat leadership behaviors relating to mission accomplishment. Communication skill and consideration of men in combat situations also contribute heavily. The conduct of combat operations, with emphasis on face-to-face briefings and pre-and post-operations, is emphasized. This is opposed to technical-managerial mission requirements. It is worth noting that an originally bi-polar factor is included in Factor III. Because this variable has a negative loading, it emphasizes the "keep cool, calm, and collected" aspect necessary for a combat leader under stress.

Factor IV, "Effective Team Leadership," is presented in Table 6. This factor primarily combines mission effectiveness and personal interaction with men. It can be further defined as emphasizing the clear direction and utilization of men in their specific team roles. This is a true combination of combat and technical-managerial leadership, because both contribute to this factor but neither is dominant. Again, the original Factor IX is bipolar, highlighting this combination of combat and technical contributions.

The final factor, Factor V, is termed "Combat vs. Technical Persistence." Table 7 presents relevant descriptors. This bipolar factor reflects, to a degree, the different emphasis required of a combat leader vs. the technical-managerial leader. The original Factor XVIII--Combat vs. Technical Persistence--clearly reflects the defining aspects of the resulting factor: the combat-necessary characteristics of keeping cool vs. the managerial characteristics of verbal concentration. The other original factor, with a positive loading, reflects combat-type behaviors. The three negative factors reflect technical-managerial skills. Factor V, consequently, truly simulates characteristics incompatible between a "combat leader" and a "technical-managerial leader."

Table 4
STRUCTURE OF REPRODUCED FACTORS: FACTOR II--QUANTITATIVE STAFF ORGANIZATION

Factor Loading*	Original Factor	Contributing Performance Variable ^b		Judgmental Descriptor of Original Factor ^c
		Individual Scale Code	Description	
.61	XXI March Order	ONEP	Noting enemy position (CL)	Communication and Staff
		OPES	Providing equipment and supplies (CL)	
		OMCS	Maintaining contact and security (CL)	
		OOMS	Outlining mission and execution (CL)	
.61	XIII March Order	OMCF	Extent mission completed	Technical-Managerial Mission Effectiveness
		OMOR	Rated motivation (effort)	
		OFIF	Following instructions	
		OMOB	March order: basic unit (CL)	
		OPLM	Planning later march units (CL)	
.58	XXIII Airfield Layout	IUTT	Cons terrain features in site eval (CL)	Technical-Managerial Mission Effectiveness
		IRRT	Thoroughness of runway report (CL)	
		ICOA	Accuracy of runway length computation (CL)	
		INSE	Number of sites evaluated	
		IOPH	Considering opnl hazards in site eval (CL)	
.55	VII Road Damage and Radiation Survey	JFRY	Computing past radiation levels (II)	Specialist
		JFEH	Computing past radiation levels (IV)	
		JFRX	Computing past radiation levels (I)	
		JFRZ	Computing past radiation levels (III)	
		JFLH	Computing past radiation levels (V)	
.40	XXIX Site Selection	DFIF	Following instructions	Communication and Staff
		DMAF	Extent mission accomplished	
		DGOM	Thoroughness in assigned task	
		JTEH	(Rd Dmg & Radn) Rec recptd radn levels (IV)	

* All loadings have been reflected in a positive direction.

^b From Appendix, Helme et al., 1971, op. cit.

^c From Table 2, Helme et al., 1971, op. cit.

Table 5
STRUCTURE OF REPRODUCED FACTORS: FACTOR III--COMBAT MISSION REQUIREMENTS

Factor Loading	Original Factor	Contributing Performance Variable *		Judgmental Descriptor of Original Factor ^b
		Individual Scale Code	Description	
.77	IV Recon. Patrol			Combat Mission Effectiveness
		MCAR	Rated overall combat aptitude	
		MMOR	Rated motivation (effort)	
		MDHR	Rated decisive without haste	
		MMCF	Extent mission completed	
		MCMF	Effective command	
		MBAR	Rated bearing and assurance	
		MMOF	Motivation (effort)	
		MGAF	General ability	
.62	XXIV Recon. Patrol			Communication and Staff
		MDER	Rated amt of detail in mission briefing	
		MOER	Rated organization of mission briefing	
		MFIB	Initial bfg on radio freq for mission (CL)	
		MFER	Rated forcefulness of mission briefing	
		MEEF	Effective expression	
.57	XXVII Recon. Patrol			Communication and Staff
		MDCR	Rated amt of detail in debrief CO after IPW	
		MEND	Debriefing CO on main aspects of IPW exp (CL)	
		MOCR	Rated org of debriefing CO after IPW	
		MFCR	Rated forcefulness of debriefing CO after IPW	
		MKCF	Keeping cool	
.54	XXVI Recon. Patrol			Command and Interaction
		MCOF	Consideration for men	
		MDWM	Disposition of wounded team members (CL)	
		MCSR	Rated cons within mission rqmts	
.49	VI Road Damage and Radiation Survey			Technical Mission Effectiveness
		JORR	Rated org of mission briefing	
		JATF	Attitude (cooperation)	
		JDHR	Rated decisive without haste	
		JLDR	Rated amount of detail in mission briefing	
		JGAF	General ability	
		JMCF	Extent mission completed	
.57	I Security Mission			Combat Mission Effectiveness
		KCAR	Rated overall combat aptitude	
		KETC	Effectiveness of total mission behavior	
		KDHR	Rated decisive without haste	
		KBAR	Rated bearing and assurance	
		KGAR	General ability	
		KMCF	Extent mission completed	
		KCSR	Rated considerate within mission requirements	
		KUMF	Understanding mission	
		KBAF	Bearing and assurance	
		KFHP	Firm handling of personnel	
.57	XIV Highway Traffic Plan			Technical Mission Effectiveness
		EMAF	Extent mission accomplished	
		EFIF	Following instructions	
		ETIT	Tonnage delivered	
		EMOR	Rated motivation (effort)	
		EBAF	Bearing and assurance	

* From Appendix, Helme et al., 1971, op. cit.

^b From Table 2, Helme et al., 1971, op. cit.

Table 5 - continued

		Contributing Performance Variable *		Judgmental Descriptor of Original Factor ^b
Factor Loading	Original Factor	Individual Scale Code	Description	
.57	X Observation Post			Combat Mission Effectiveness
		NCAR	Rated overall combat aptitude	
		NBAF	Bearing and assurance	
		NMOR	Rated motivation (effort)	
		NMCF	Extent mission completed	
		NTTC	Effective mission behaviors (CL)	
		NECF	Effective command	
		NADS	Complete and accurate rept target locations	
.55	IX (Cross Task): Direction of Men vs. Self Reliance			Command and Interaction
			<u>Task</u> <u>Variable</u>	
		LSUT	Roadblock Training and supervision of subordinates (CL)	
		JKCF	Rd Dmg and Radn Keeping cool	
		LOSS	Roadblock Controlling on-site security (CL)	
		HMOR	Weap Assess Rated motivation (effort)	
	(negative)	OESF	March Order Endurance and stamina	
.52	III Roadblock			Combat Mission Effectiveness
		LCAR	Rated overall combat aptitude	
		LBAR	Rated bearing and assurance	
		LMOR	Rated motivation (effort)	
		LDHR	Rated decisive without haste	
		LOBR	Rated org of mission briefing	
		LFBR	Rated forcefulness of mission briefing	
		LMOF	Motivation (effort)	
		LDBR	Rated amount of detail in mission briefing	
		LUMF	Understanding mission	
.51	V Production Analysis			Technical-Managerial Mission Effectiveness
		BRLR	Rated relevance of written report	
		BADR	Rated overall admin effectiveness	
		BMCR	Rated language of written report	
		BPUC	Written report: statement of purpose (CL)	
-.58	XIX Improper Supply Records			Command and Staff
		CSCR	Rated tact and control in stress briefing	
		CSXR	Rated approp flexibility in stress briefing	
		CSAR	Rated approp aggressiveness in stress briefing	

* From Appendix, Helme et al., 1971, op. cit.

^b From Table 2, Helme et al., 1971, op. cit.

Table 6
STRUCTURE OF REPRODUCED FACTORS: FACTOR IV--EFFECTIVE TEAM LEADERSHIP

Contributing Performance Variable ^a				
Factor Loading	Original Factor	Individual Scale Code	Description	Judgmental Descriptor of Original Factor ^b
.58	VIII Auto Inspection			Technical-Managerial Mission Effectiveness
		GMAF	Extent mission accomplished	
		GURR	Rated use of reference manuals	
		GMOR	Rated motivation (effort)	
		GTRP	Defects appropriately treated	
		GTDG	Defects accurately diagnosed	
		GBAF	Bearing and assurance	
		GAPR	Rated trouble-shooting approach	
.57	III Roadblock	GEQF	Familiarity with equipment	Combat Mission Effectiveness
		LCAR	Rated overall combat aptitude	
		LEAR	Rated bearing and assurance	
		LMOR	Rated motivation (effort)	
		LDHR	Rated decisive without haste	
		LOBR	Rated organization of mission briefing	
		LFBR	Rated forcefulness of mission briefing	
.56	III Roadblock	LMOF	Motivation (effort)	Technical-Managerial Mission Effectiveness
		LDBR	Rated amt of detail in mission briefing	
		LUMF	Understanding mission	
		FMAF	Extent mission accomplished	
		FURR	Rated use of reference manuals	
		FCCD	Handling circuit defects	
		FEQF	Familiarity with equipment	
.54	XVII Auto Inspection	FMOR	Rated motivation (effort)	Command and Interaction
		FAPR	Rated trouble-shooting approach	
		FFIF	Following instructions	
		FEQD	Handling equipment defects	
		GCMF	Effective command	
		GUPR	Rated utilization of personnel	
		GBAF	Bearing and assurance	
.48	XXV Roadblock			Command and Interaction
		LCOF	Consideration for men	
		LGAF	General ability	
		LEAF	Bearing and assurance	
		LEEF	Effective expression	
		LCTA	Tactical control (CL)	
		MCCE	(Recon Patrol) Eff in face of enemy (CL)	

^a From Appendix, Helme et al., 1971, op. cit.

^b From Table 2, Helme et al., 1971, op. cit.

Table 6 - continued

Contributing Performance Variable *							
Factor Loading	Original Factor	Individual Scale Code	Description	Judgmental Descriptor of Original Factor ^b			
.47	IX (Cross Task): Direction of Men vs. Self-Reliance			Personal Resourcefulness			
			<u>Task</u>		<u>Variable</u>		
		LSUT	Roadblock		Tng and supervision of subs (CL)		
		JKCF	Rd Dmg and Radn		Keeping cool		
		LOSS	Roadblock		Controlling on-site security (CL)		
		HMOR	Weap Assess		Rated motivation (effort)		
					Combat		
		(negative)	OESF		March Order	Endurance and stamina	
		.42	XVI Recon. Patrol				Personal Resourcefulness
					NMAS	Maintaining security in PW interrogation	
MSCR	Rated self-control in PW interrogation						
MEAP	Avoiding pitfalls in PW interrogation						
.42	VI Road Damage and Radiation Survey			Technical-Managerial Mission Effectiveness			
		JOER	Rated overall eff in mission				
		JMOR	Rated motivation (effort)				
		JBAR	Rated bearing and assurance				
		JMOF	Motivation (effort)				
		JORR	Rated organization of mission briefing				
		JAFT	Attitude (cooperation)				
		JDHR	Rated decisive without haste				
		JLDR	Rated amount of detail in mission briefing				
		JGAF	General ability				
		JMCF	Extent mission completed				

* From Appendix, Helme et al., 1971, op. cit.

^b From Table 2, Helme et al., 1971, op. cit.

Table 7
STRUCTURE OF REPRODUCED FACTORS: FACTOR V--COMBAT VS. TECHNICAL PERSISTENCE

Factor Loading	Original Factor	Contributing Performance Variable *		Judgmental Descriptor of Original Factor ^b
		Individual Scale Code	Description	
.61	XVIII (Cross Task): Combat vs. Technical Persistence			Personal Resourcefulness
			<div>TaskVariable</div>	
		KESF	Secur Mission Endurance and stamina	
		JJOB	Rd Dmg and Radn Handling tactical emergency by radio	
		JESF	Rd Dmg and Radn Endurance and stamina	
	(negative)	IUMR	Airfield Layout Rated understanding mission	
		ERST	Hwy Traffic Concentration under stress	
.57	XX Road Damage and Radiation Survey			Command and Interaction
		JCSR	Rated consideration within mission rqmts	
		JCOF	Consideration for men	
		DECF	(Site Selection Task) Keeping cool	
		JHAG	Terminating mission to save team	
		JTDC	Briefing team on road damage mission	
-.63	XXVIII Road Damage and Radiation Survey			Specialist
		JTRX	Recording reported radiation levels (I)	
		JTRY	Recording reported radiation levels (II)	
-.46	XIV Highway Traffic Plan			Technical-Managerial Mission Effectiveness
		EMAF	Extent mission accomplished	
		EFIF	Following instructions	
		ETIT	Tonnage delivered	
		EMOR	Rated motivation (effort)	
		EBAF	Bearing and assurance	
-.33	XII Improper Supply Records			Communication and Staff
		CSBR	Rated bearing and poise in stress briefing	
		CSOR	Rated organization of stress briefing	
		CSMR	Rated motivation in stress briefing	
		CSFR	Rated fluency in stress briefing	
		CSAR	Rated approp aggressiveness in stress briefing	
		CSPR	Rated adherence to principles in stress briefing	

* From Appendix, Helme et al., 1971, op. cit.

^b From Table 2, Helme et al., 1971, op. cit.

CONCLUSIONS

The results of the present factor analysis do not completely duplicate the factor structure that Helme, et al., presented in 1971. This perhaps, is to be expected. The farther removed from the original data, the less variance is accounted for, as Table 2 indicates. Forty percent of the total variance is accounted for by the five factors. Considering the type of factoring that was done, this amount of variance seems to be acceptable.

The factor structures uncovered in this investigation parallel those found by Helme et al. (Appendix A). Because the present research is a factor of the original factors, behaviors with some common elements will tend to be grouped together. This is illustrated in the column "Judgmental Descriptor of Original Factor" on Tables 3-7. For example, in Factor I (Table 3), combat mission effectiveness is included with many technical mission effectiveness factors, perhaps indicating that those behaviors contributing to combat mission effectiveness also comprise technical mission effectiveness. Commonality of behaviors is important when factoring factors is involved, because it is those behaviors that are being clustered.

When Helme et al. uncovered eight distinct factors, the analysis was based on 28 of the original factors plus 11 marker variables. The present matrix was composed of only the original 30 factors. Interestingly, the resulting five factors closely parallel the original eight. General aspects of leadership common to both types of leader resulted. "Completed Staff Work," "Quantitative Staff Organization," and "Effective Team Leadership" are necessary to both types of leaders if they are to be effective. The final factor, "Combat vs. Technical Persistence," most clearly reflects the differentiation between a Combat Leader and a Technical-Managerial Leader.

The present results seem to be more general than the original eight factors. More overlapping behaviors common to both technical/administrative and combat leadership styles were uncovered than in the earlier investigation. The present solution parallels those factors found earlier and assists in the interpretation of leadership dimensions.

APPENDIXES

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Appendix A. Loadings of marker and independent variables on eight basic factors of OEC officer performance	15
B. Scales obtained from internal analysis of OEC situation tasks	17

APPENDIX A LOADINGS OF MARKER AND INDEPENDENT VARIABLES ON
EIGHT BASIC FACTORS OF OEC OFFICER PERFORMANCE
(Reproduced from Helme et al., 1971; Table 3)

Code	Specific Variable	OEC Task	Loading	Factor Marked	Type of Marker
Factor I: Technical/Managerial Leadership					
CTRS	Correction of detailed supply records	Supply Rec (A)	.61		Indep variable
OMCF	Extent mission completed	March Order (C)	.54	XIII	Mission Accomp
BPRA	Prodn achieved by work reasgt	Prod Analysis (A)	.48		Indep variable
AALM	Charting allocation of manpower	Office Mgt (A)	.48		Indep variable
BRLR	Relevance of written report	Prod Analysis (A)	.48	V	Mission Accomp
JOER	Overall effectiveness of mission	Rd Dmg & Radn (T)	.40	VI	Mission Accomp
EMAF	Extent mission accomplished	Hwy Traffic (A)	.34	XIV	Mission Accomp
JFEH	Computing past radn levels	Rd Dmg & Radn (T)	.31	VII	Specialist
AFND	Correcting misc opn deficiencies	Office Mgt (A)	.29		Indep variable
IUTT	Consid terrain features in site eval (CL)	Airfld Layout (T)	.29	XXIII	Mission Accomp
ASQO	Sequencing work flow	Office Mgt (A)	.28	XXX	Commo and Staff
IENG	Engr considerations in site eval (CL)	Airfld Layout (T)			Indep variable
DBAF	Bearing and assurance	Site Select (A)	.27	XI	Mission Accomp
CSBR	Bearing and poise in stress briefing	Supply Rec (A)	.26	XII	Mission Accomp
Factor II: Combat Leadership					
NCAR	Overall combat aptitude	Obsn Post (C)	.62	X	Mission Accomp
KCAR	Overall combat aptitude	Secur Mission (C)	.55	I	Mission Accomp
LCAR	Overall combat aptitude	Roadblock (C)	.47	III	Mission Accomp
MCAR	Overall combat aptitude	Recon Patrol (C)	.47	IV	Mission Accomp
JOER	Overall effectiveness of mission	Rd Dmg & Radn (T)	.46	VI	Mission Accomp
GMAF	Extent mission accomplished	Auto Inspect (T)	.41	VIII	Mission Accomp
FMAF	Extent mission accomplished	Commo Exhibit (T)	.39	II	Mission Accomp
HMLD	Suppl reporting identification clues	Weap Assess (T)	.31	XV	Mission Accomp
CSBR	Bearing and poise in stress briefing	Supply Rec (A)	.29	XII	Mission Accomp
DBAF	Bearing and assurance	Site Select (A)	.27	XI	Mission Accomp
EMAF	Extent mission accomplished	Hwy Traffic (A)	.25	XIV	Mission Accomp
Factor III: Personal Resourcefulness					
OESF	Endurance and stamina	March Order (C)	.64	IX	Pers resource
MFFE	Aggress conduct in hands of enemy (CL)	Recon Patrol (C)	.43		Indep variable
JTRX	Recording reported radiation levels	Rd Dmg & Radn (T)	.35	XXVIII	Specialist
BAVR	Conciseness of written report	Prod Analysis (A)	-.25	XXII	Commo and Staff
LCAR	Overall combat aptitude	Roadblock (C)	-.38	III	Mission Accomp

APPENDIX A (continued)

Code	Specific Variable	OEC Task	Loading	Factor Marked	Type of Marker
<u>Factor IV: Command of Men</u>					
GCMF	Effective command	Auto Inspect (T)	.47	XVII	Comd & Interaction
MIBM	Init brief on mission purpose (CL)	Recon Patrol (C)	.37	XXIV	Commo and Staff
MCAR	Overall combat aptitude	Recon Patrol (C)	.30	IV	Mission Accomp
GMAF	Extent mission accomplished	Auto Inspect (T)	-.25	VIII	Mission Accomp
HDCA	Thorough tech descript of cartridge	Weap Assess (T)	-.30		Indep variable
<u>Factor V: Mission Persistence</u>					
GTII	Completeness of vehicle identifi info	Auto Inspect (T)	.40		Indep variable
MMAS	Maintain security in PW interrogation	Recon Patrol (C)	.38	XVI	Pers Resource
JHAG	Cont mission in face of enemy threat	Rd Dmg & Radn (T)	.33	XX	Comd & Interaction
LCOF	Consideration for men	Roadblock (C)	.32	XXV	Comd & Interaction
<u>Factor VI: Executive Direction</u>					
KESF	Endurance and stamina	Secur Mission (C)	.53	XVIII	Comd & Interaction
DBAF	Bearing and assurance	Site Select (A)	.49	XI	Mission Accomp
JOER	Overall effectiveness of mission	Rd Dmg & Radn (T)	.32	VI	Mission Accomp
CNMC	Form and content of written memo	Supply Rec (A)	.27		Indep variable
<u>Factor VII: Tactical Skills</u>					
CMCS	Maintaining contact and security (CL)	March Order (C)	.45	XXI	Commo and Staff
CMCF	Extent mission completed	March Order (C)	.41	XIII	Mission Accomp
IENG	Engr consideration in site eval (CL)	Airfld Layout (T)	.31		Indep variable
MCAR	Overall combat aptitude	Recon Patrol (C)	.26	IV	Mission Accomp
<u>Factor VIII: Technical Skills</u>					
FMAF	Extent mission accomplished	Commo Exhibit (T)	.37	II	Mission Accomp
GDIA	Avg importance of defects detected	Auto Inspect (T)	.36		Indep variable
CSCR	Tact and control in stress briefing	Supply Rec (A)	.33	XIX	Comd & Interaction
GMAF	Extent mission accomplished	Auto Inspect (T)	.32	VIII	Mission Accomp
EMAF	Extent mission accomplished	Hwy Traffic (A)	.28	XIV	Mission Accomp

^aFactor loading and variable description have been reflected.

APPENDIX B

SCALES OBTAINED FROM INTERNAL ANALYSIS
OF OEC SITUATION TASKS
(From Helme et al., 1971; Appendix)

OFFICE MANAGEMENT TASK

Organization Chart Checklist

AIDD Charting Organization Functions
AALM Charting Allocation of Manpower

Flow Process Chart Checklist

ARCW Revising Work Flow
ASQO Sequencing Work Flow
ARTP Retaining Effective Work Flow Steps

Deficiency Checklist

AFND Correcting Miscellaneous Operating Deficiencies

Total Task Performance

ATTT Sum of All 6 Scores Above

PRODUCTION ANALYSIS TASK

Summary Scoring Sheet

BADR Rated Overall Administrative Effectiveness

Style Rating Scale (Written Report)

BRLR Relevance
BEMR Emphasis
BMCR Language
BSAR Sentence Adequacy
BAVR Conciseness
BOSR Style
BEER Completeness of Written Report:
BSAR - BAVR
BSTR Sum of Ratings on Written Report Style:
BRLR + BEMR + BMCR + BSAR + BAVR + BOSR

Written Report Content Checklist

BIBC Introduction and Background
BPUC Statement of Purpose
BBAC Situational Constraints
BPAC Critique of Assignments
BJRC Use of Job Records
BCAC Computational Approach
BSCC Solution and Closure
BTCC Adequacy of Content of Written Report:
Sum of 7 preceding scores

Proposed Utilization of Repairmen

BPRA Production Achieved by Work Reassignments

Total Task Performance

BTTT Sum of Weighted Standard Scores: (Base 10)
 $2 (\text{BADR} + \text{BOSR}) + 11 (\text{BPRA}) + 5 (\text{BTCC})$

IMPROPER SUPPLY RECORDS TASK

Stress Rating Scale (Briefing Allied Officer)

CSFR Fluency
CSOR Organization
CSMR Motivation
CSBR Bearing and Poise
CSAR Appropriate Aggressiveness
CSCR Tact and Control
CSXR Appropriate Flexibility
CSPR Adherence to Principles
CTSR Effectiveness in Stress Briefing:
Sum of above except CSCR and CSXR
CTCR Restraint in Stress Briefing:
Sum of CSCR and CSXR

Stock Accounting Record

CTRS Correction of Detailed Supply Record

Briefing Checklist

CBRC Correctness of Content of Stress Briefing

Memorandum Checklist

CMMC Form and Content of Written Memo

Total Task Performance

CRTT Sum of Weighted Standard Scores:

15 (CTSR) + 40 (CTRS) + 35 (CBRC) + 10 (CMMC)

SITE SELECTION TASK

Descriptive Report and Rating Supplement (Ratings)

DMOR Motivation (Effort)
DATR Attitude (Cooperation)
DUMR Understanding Mission
DBAR Bearing and Assurance

Rated Performance Qualities

DBAF Bearing and Assurance
DEEF Effective Expression
DKCF Keeping Cool
DESF Endurance and Stamina
DEQF Familiarity with Equipment
DFIF Following Instructions
DMAF Extent Mission Accomplished
DCMF Effective Command
DGIF General Impression
DTTF Performance Quality:
Sum of 9 Preceding Scores
DTFR Sum of Rating Judgments:
DMOR + DATR + DUMR + DBAR + DBAF + DEEF + DKCF

Selection Justification Score Sheet

DSLJ Adequacy of Site Selection Justifications
DSIQ Merit of Sites Chosen (Sector I)
DIIQ Merit of Sites Chosen (Sector II)

Problem Approach Checklist

DPAC Asking Clarifying Questions

Summary Evaluations

DCOM Thoroughness in Assigned Task:

DFIF + DMAF + Report Evaluation (Prob Approach CL) and two
items of rejected site justification (Sel Just Score Sheet)

Briefing Checklist

DBRS Effectiveness in Stress Briefing

Total Task Performance

DTTT Sum of Weighted Standard Scores:

9 (DSIQ + DIIQ + DSLJ + DCOM - DFIF - DMAF) +
7 (DPAC + DBRS, 1) + 10 (DBRS, 2)

HIGHWAY TRAFFIC TASK

Descriptive Report and Rating Supplement *

EMOR, EATR, EUMR

Rated Performance Qualities *

EBAF, EEEF, EKCF, EESF, EFIF, EMAF

ERST Concentration Under Stress:

EKCF + EESF

ESTP Style of Performance:

Sum of EUMR, EBAF, EEEF, EMOR, EATR

ETTF Performance Quality:

Sum of EBAF, EEEF, EKCF, EESF, EFIF, EMAF

Highway Traffic Plan Checklist

EPRS Procedural Skills

EATD Attention to Data Requirements:

Note restrictions, identify depots + EFIF + EMAF

Total Task Performance: Highway Traffic Plan Worksheets

ETTT Tonnage Delivered

* See same variables with initial code letter D

COMMUNICATIONS EXHIBIT TASK

Descriptive Report (Ratings)*

FMOR, FATR
FTMR Sum of FMOR + FATR

Rated Performance Qualities*

FBAF, FKCK, FEQF, FFIF, FMAF, FCMF, FGIF
FTTF Performance Quality
Sum of 7 Preceding Scores

Problem Approach Checklist (Ratings)

FAPR Trouble-shooting Approach
FUPR Utilization of Personnel
FURR Use of Reference Manuals

Summary Evaluations

FFAQ Knowledge of Equipment:
Sum of FEQF, FAPR, FURR
FUPS Use of Personnel:
Weighted Sum - 2 (FUPR + FCMF) + FFIF
FBER Manner and Bearing:
Sum of FBAF, FKCF, FGIF
FPAKQ Estimated Prior Knowledge of Equipment

Question Scoring Sheet

FEQQ Correctness of Briefing on Equipment Functions
FCCQ Correctness of Briefing on Circuits
FTQU Correctness of Whole Briefing:
Sum of FEQQ, FCCQ, and Minor Wiring Questions

Trouble Scoring Sheet

FCCD Handling Circuit Defects
FLBD Handling Labeling Deficiencies
FEQD Handling Equipment Defects
FTTB Handling of all Defects:
Sum of FCCD, FLBD, FEQD, and Minor Defects

Total Task Performance

FTTT Sum of Weighted Standard Scores:
 $3 (FTTB) + FTQU$

* See same variables with initial code letter D

AUTOMOTIVE INSPECTION TASK

Descriptive Report (Ratings) *

GMOR, GATR

Rated Performance Qualities

GBAF, GEEF, GEQF, GFIF, GMAF, GCMF, GGIF

GTTF Performance Quality:

Sum of 7 Preceding Scores

Problem Approach Checklist ^b

GAPR, GUPR, GURR

Automotive Inspection Scoring Forms

GTII Completeness of Vehicle Identifying Information

GTDG Defects Accurately Diagnosed

GTRP Defects Appropriately Treated

GRCD Failure to Spread Effort over all Vehicles

GDIA Average Importance of Defects Detected

GRLS Proportion of Detected Defects Diagnosed

GRCO Proportion of Treated Defects Personally Repaired

Total Task Performance

GTTF Weighted Sum:

$2 (GTDG + GTRP + GTII) + \text{Number of Defects Personally Repaired}$

WEAPONS ASSESSMENT TASK

Descriptive Report (Ratings) *

HMOR, HATR

Performance and Tactical Data Score Sheet

HNUL Basic Reporting of Identification Clues

HDTE Describing Technical Characteristics of Weapon

HDCA Thorough Technical Description of Cartridge

HADD Reporting Situation in Which Obtained

HMED Reporting Mechanical Details and Other Intelligence

HMID Supplementary Reporting of Identification Clues

HADI Including Additional Descriptive Details

* See same variables with initial code letter D.

^b See same variables with initial code letter F.

Total Task Performance

HTTT Sum of 7 Preceding Scores

AIRFIELD LAYOUT TASK

Rating Supplement

IUMR Understanding Mission

Airfield Layout Checklist

IRTT Thoroughness of Runway Report
ICOA Accuracy of Runway Length Computation
ITRL Determination of Runway Length:
Sum of IRRT, ICOA, and Minor Items of Behavior
IOPH Considering Operational Hazards in Site Evaluation
IENG Engineering Considerations in Site Evaluation
IUTT Considering Terrain Features in Site Evaluation
IGEO Geographical Considerations in Site Evaluation
ITSE Adequacy of Site Evaluations:
Sum of IOPH, IENG, IUTT, IGEO, and Minor Items
INSE Number of Sites Evaluated
ITWS Adequacy of Evaluations Weighted by Number of Sites:
ITSE (INSE + 5)

Total Task Performance

ITTT Weighted Sum:
5 (ITRL) + ITWS

ROAD DAMAGE AND RADIATION SURVEY TASK

Rating Supplement

JMOR Motivation (effort)
JATR Attitude (cooperation)

Briefing Men for Mission

JORR Organization
JFDR Forcefulness
JLDR Amount of Detail

Conduct of Mission

JBAR Bearing and Assurance
JOER Overall Effectiveness
JCSR Consideration for Men within Mission Requirements
JDHR Decisiveness without Haste

Performance Qualities

JBAF, JEEF, JKCF, JESF, JCMF, JGIF*
JUMF Understanding Mission
JMOF Motivation (effort)
JATF Attitude (cooperation)
JCOF Consideration for Men
JGAF General Ability
JMCF Extent Mission Completed
JTTF Performance Quality:
Sum of 12 Preceding Scores

Team Leader Checklists

JJOG Appropriate Orders to Team out of Gas
JHAG Terminating Mission to Save Team
JTLC Maintaining Control of Teams on Mission
JTIC Obtaining Intelligence from Teams on Mission

Conduct of Survey Checklist

JTSC Keeping Superior Informed during Survey

End-of-Problem Briefing Checklist

JTPC Debriefing to Superior on Road Damage and Intelligence

Road Damage Briefing Checklist

JTDC Briefing Team on Road Damage Mission

Radiation Survey Briefing Checklist

JTRC Briefing Team on Radiation Survey
JTRX, JTRY, JTRZ, JTEH, JTLH Recording Reported Radiation Levels
JFRX, JFRY, JFRZ, JFEH, JFLH Computing Past Radiation Levels
JLRX, JLRZ, JLEH, JLIH Computing Future Radiation Levels

SECURITY MISSION TASK

Rating Supplement

KBAR, KCSR, KDHR^b
KHDR Quick Decisions

* See same variables with initial code letter D

^b See same variables with initial code letter J

Performance Qualities

KBAF, KKCF, KESF, KCMF, KGIF ^a
KUMF, KMOF, KATF, KGAF, KMCF ^b
KTTF Performance Quality:
Sum of 10 Preceding Scores

Behavior Checklist

KOSS Controlling On-Site Security
KUTM Effective use of Personnel
KLDI Tactical Direction of Subordinates
KEMM Evaluation of Men for Mission
KEDP Effectiveness of Defense Plan
KFHP Firm Handling of Personnel:
KCMF - "Softhearted" Score + Handling Inefficient NCO
KTTC Effectiveness of Total Mission Behavior:
KOSS + KUTM + KLDI + KEMM + KEDP + Handling of NCO
KCAR Rated Overall Combat Aptitude

Total Task Performance

KTTF Sum of Weighted Standard Scores:
 $71 (KTTC) + 20 (KCAR) + 4 (KCSR) + 3 (KDHR) + 2 (KBAR)$

ROADBLOCK TASK

Descriptive Report and Rating Supplement (Ratings)

LMOR Motivation (effort)
LATE Attitude (cooperation)
LUMR Understanding Mission
LBAR Bearing and Assurance
LDHR Decisive without Haste

Briefing Men for Mission

LOBR Organization
LFBR Forcefulness
LDBR Amount of Detail
LTSR Sum of Performance Ratings:
 $LOBR + LFBR + LDBR + LBAR + LDHR$

^a See same variables with initial code letter D

^b See same variables with initial code letter J

Performance Qualities

LBAF, LEEF, LKCF, LESF, LCMF, LGIF^a

LUMF, LMOF, LATF, LCOF, LGAF, LMCF^b

LTF Performance Quality:

Sum of 12 Preceding Scores

Summary Scores

LTMR Attitude and Motivation:

Sum of LMOR, LATR, LMOF, LATF

LCFO Confidence and Forcefulness:

Sum of LBAR, LFBR, LBAF, LEEF, LKCF, LGIF, LGAF

LINM Content of Mission Briefing:

Sum of LOBR, LDBR

Behavior Checklist

LCHT Correct Charges and Number of Trees

LEEA Effectiveness of Abatis:

Sum of LMCF, LCHT, and Two CL Scores on Abatis

LSUT Training and Supervision of Subordinates

LOSS Controlling on-site Security

LHAS Capture, Handling, Search of Enemy Sniper

LCTA Tactical Control

LTTC Effectiveness of Mission Behavior:

LSUT + LOSS + LHAS + LCTA + Two CL Scores on Abatis

LCAR Rated Overall Combat Aptitude

Total Task Performance

LTTT Sum of Weighted Standard Scores:

40 (LTTC) + 20 (LTSR) + 20 (LCHT) + 20 (LCAR)

RECONNAISSANCE PATROL TASK

Descriptive Report and Rating Supplement (Ratings)

MMOR, MATR, MBAR, MCSR, MDHR^b

^a See same variables with initial code letter D

^b See same variables with initial code letter J

Briefing Men for Mission

MOER Organization
MFER Forcefulness
MDER Amount of Detail

Performance Qualities

MBAF, MEEF, MKCF, MCMF, MGIF *
MUMF, MMOF, MATF, MCOF, MGAF, MMCF ^b
MTTF Performance Quality:
Sum of 11 Preceding Scores

Final Debriefing after Prisoner-of-War Experience

MOCR Organization
MFCR Forcefulness
MDCR Amount of Detail

Behavior Checklist

MIBM Initial Briefing on Purpose of Mission
MRIB Initial Briefing on Radiation Reporting
MFIB Initial Briefing on Radio Frequency
MAMT Timing of Mission Phases
MSCN Supervision and Control of NCO's
MBCM Aspects of Mission Control
MEAN Motivating NCO Anxious over Radiation
MORN Obtaining Radiation Readings from NCO's
MRRR Reporting Radiation Readings to CO as Received
MSES Spontaneous Effectiveness Under Stress
MRPI Noting and Reporting Passive Intelligence
MAPS Noting Passive Intelligence Under Stress
MARI Reporting Active Intelligence During Mission
MAIA Alertness and Initiative in Necessary Actions
MDWM Disposition of Wounded Team Members
MDMS Reporting Mission Status while in Progress
MCCE Detailed Behaviors in Enemy Contact
MFFE Aggressive Conduct in Hands of Enemy
MEND Debriefing CO on POW Experience
MDIO Debriefing CO on Details at IPW Site
MTTC Effectiveness of Total Mission Behavior:
Sum of 20 Preceding Scores
MCAR Rated Combat Aptitude

* See same variables with initial code letter D

^b See same variables with initial code letter J

Equipment Status Report

MTSP Judicious Choice of Supplies for Mission

IPW Checklist

MTWI Withholding Specific Info in PW Interrogation
MEAP Avoiding Pitfalls in PW Interrogation

IPW Rating Scale

MBLR Belligerence in PW Interrogation
MUCR Uncongeniality in PW Interrogation
MSCR Self-Control in PW Interrogation
MRTR Reticence in PW Interrogation

IPW Scoring Sheet

MMAS Maintaining Security in PW Interrogation
MTIP Security Performance in PW Interrogation:
Composite of MMAS and MTWI

Total Task Performance

MTTT Weighted Sum of Standard Scores:
65 (MMTC) + 8 (MCAR) + 8 (MEAP + MTIP)
+7 (MBAR + MCSR + MDHR) + 4 (MOER + MFER + MDER)
+3 (MTSP) + 3 (MOCR + MFCR + MDCR)
+2 (MSCR + MRTR + MUCR)

OBSERVATION POST TASK

Descriptive Report (Ratings)

NMOR, NATR ^b

Performance Qualities

NBAF, NKCF, NESF, NEQF, NFIF, NGIF ^a
NMCF Extent Mission Completed
NECF Effective Command
NTTF Performance Quality:
Sum of 8 Preceding Scores

^a See same variables with initial code letter D

^b See same variables with initial code letter J

Behavior Checklist and Target Report Sheet

NADS Completeness and Accuracy of Reporting Target Location
NARS Reporting Observed Enemy Action
NFMS Detecting and Firing on Hostile Missile
NCAR Rated Overall Combat Aptitude
NTTC Other Effective Mission Behavior

Summary Score

NTSR Sum of Rating Judgments:
NMOR + NATR + NTTF + NCAR

Total Task Performance

NTTT Sum of Weighted Standard Scores
 $60 (NADS + NARS + NFMS) + 35 (NTTC) + 5 (NCAR)$

MARCH ORDER TASK

Descriptive Report (Ratings)

OMOR, OATR^b

Performance Qualities

OBAF, OESF, OFIF, OGIF*
OMCF Extent Mission Completed
OTTF Performance Quality:
Sum of 5 Preceding Scores

Performance Checklist

ONEP Noting Enemy Positions
OMOB March Order: Basic Unit
OPLM Planning Later March Units
OMCS Maintaining Contact and Security
OOME Outlining Mission and Execution
OPES Providing Equipment and Supplies
OGRH Giving Leadings and References
OINO Brief but Responsive to Interrupting Superior
OINE Judicious Disposition of Complaining EM

Summary Scores

OCMB Effective Military Behavior:
Sum of OESF, OGIF, OINO
ODAM Drive to Accomplish Mission:
Sum of OBAF, OFIF, OMOR, OATR, OMCF

Total Task Performance

OTTT Sum of Unweighted Scores:
 $ONEP + OMOB + OPLM + OMCS + OOME + OPES + OGRH$

* See same variables with initial code letter D

^b See same variables with initial code letter J